

***Final***  
**LONG TERM GROUNDWATER MONITORING PLAN**  
**St. Paul Island, Alaska**

**Pribilof Islands Environmental Restoration Project**  
**St. Paul Island, Alaska**

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## ACRONYMS AND ABBREVIATIONS

µg/L	Microgram per liter
AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
ADNR	Alaska Department of Natural Resources
BTEX	Benzene, Toluene, Ethylbenzene, total Xylene
CWMA	Critical water management area
DRO	Diesel range organics
EPA	U.S. Environmental Protection Agency
GRO	Gasoline range organics
mg/L	Milligram per liter
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
PAH	Polynuclear aromatic hydrocarbons
PCS	Petroleum-contaminated soil
QA	Quality assurance
QC	Quality control
SVOC	Semivolatile organic compound
Tetra Tech	Tetra Tech EM Inc.
TDS	Total dissolved solids
TPA	Two-party Agreement
VOC	Volatile organic compound

## EXECUTIVE SUMMARY

This long term groundwater monitoring plan addresses 87 wells installed on St. Paul Island to gather information critical to environmental investigations and remediation planning pursuant to a Two Party Agreement (TPA) between National Oceanic and Atmospheric Administration (NOAA) and the State of Alaska Department of Environmental Conservation (ADEC). Groundwater studies utilizing these wells provide data on contaminant concentration, fate, and transport at island locations where past government operations contributed to the contamination of the site. In the future, a select number of these monitoring wells will be needed for determining groundwater contaminant concentration trends at TPA sites in order to gauge the long term effectiveness of remedial actions, and to monitor for contaminant migration. However, monitoring wells also pose a liability by providing a potential conduit for introducing contaminants to groundwater and being an impediment to use of the land around them. Therefore, wells that are not needed by NOAA for long term groundwater monitoring will be decommissioned in accordance with applicable ADEC requirements or, at some locations, offered for transfer of ownership.

Wells at four sites where NOAA's TPA related remedial activities have been completed will be offered for transfer of ownership to U.S. Department of Defense or a third party that potentially has responsibilities for cleanup in areas monitored by the transferred wells. If the transfers are not accepted within 90 days following an official written offer, then NOAA will decommission these wells.

Monitoring wells addressed by this plan are located at eight sites on St. Paul Island. Of the 87 wells, 36 will be retained for long term monitoring; 20 will be decommissioned; and 31 will either be transferred to parties other than NOAA or decommissioned. The retained wells will be used to monitor groundwater for a minimum of either three or five years depending on the site; thereafter NOAA will evaluate the data and submit a recommendation to ADEC for further sampling or closure. Water samples will be analyzed for contaminants specific to each site. Table 2-1 summarizes plans for wells at each of the St. Paul Island sites; Figures 2-3 through 2-11 provide well locations.

## 1.0 INTRODUCTION

The National Oceanic and Atmospheric Administration (NOAA) National Ocean Service, through its Office of Response and Restoration, Pribilof Project Office, is responsible for site characterization and restoration on St. Paul Island, Alaska. Public Law No. 104-91 of 1996 (Pribilof Environmental Restoration Act) and Public Law 106-562 of 2000 (Pribilof Transition Act) provide the mandate for these activities. The Two-party Agreement (TPA) signed on January 26, 1996, between NOAA and the Alaska Department of Environmental Conservation (ADEC) provides the framework for site restoration (NOAA 1996).

St. Paul Island is the largest of the Pribilof Islands, a five-island archipelago in the Bering Sea (Figure 1-1). The other islands include St. George Island, which is the second largest of the Pribilof Islands, Otter Island, Sea Lion Rock, and Walrus Island. The only inhabited islands are St. Paul and St. George.

This long-term groundwater monitoring plan addresses eight sites on St. Paul Island (Figure 1-2) where NOAA installed 87 monitoring wells to evaluate the nature and extent of groundwater contamination.

These sites are:

- St. Paul Landfill (TPA Site 5)
- City of St. Paul (numerous TPA 9 Sites and TPA Site 11)
- Lukanin Bay (TPA Site 12)
- Salt Lagoon Diesel Seep (TPA Site 13)
- Icehouse Lake (TPA Site 14)
- National Weather Service (NWS) Land Spreading Area (non-TPA) /Oil Drum Dump (TPA Site 1)
- Vehicle Boneyard (TPA Site 2)
- Telegraph Hill Scoria Pit (TPA Site 15a)

Formerly Used Defense Sites (FUDS), with environmental remediation responsibilities shared between NOAA and Department of Defense (DOD), are either co-located with or adjacent to: TPA Site 1 (Oil Drum Dump), TPA Site 4 (Vehicle Boneyard), City of St. Paul TPA Site 9i (E-Shop/Radio Building and Duplex), and TPA Site 15a (Telegraph Hill Scoria Pit).

NOAA has completed remedial activities at all eight sites pursuant to the TPA. NOAA conducted groundwater monitoring at all the sites; concentrating on the City of St. Paul (the City), the Salt Lagoon Diesel Seep, Icehouse Lake, Lukanin Bay, and the St. Paul Landfill in 2003 and 2004. Details on island geology, hydrogeology, and groundwater sampling results for these sites can be found in Tetra Tech EM Inc.'s *Final Field Investigation Report, Pribilof Islands Environmental Restoration Project, St. Paul Island, Alaska* (Tetra Tech 2005a).

## **2.0 LONG-TERM GROUNDWATER MONITORING PLANS**

The following sections provide information on the background, remedial actions taken, groundwater monitoring results, planned well disposition and long-term groundwater monitoring plans for each of the eight sites addressed by this document. Table 2-1 summarizes long-term plans for each well.

### **2.1 CITY OF ST. PAUL**

The City consists of the original settlement of the Village of St. Paul, with residential housing, schools and shops situated on a hill overlooking Village Cove and St. Paul Harbor. The City also contains Tract 46, which encompasses most of the harbor front and industrial area (Figure 2-1). TPA sites in the City have petroleum hydrocarbon contamination of soil and groundwater as a result of fuel leaking from storage tanks, leakage from fuel supply pipelines, and spills during fuel transfer operations.

Remedial action sites within the City include many TPA Site 9 sub areas, and the Former Diesel Tank Farm (TPA Site 11). Soil excavations within the City removed nearly 18,000 cubic yards of petroleum-contaminated soil (PCS), resulting in a significant reduction of the amount of vadose zone petroleum available for groundwater contamination. NOAA is in receipt of Conditional Closures from ADEC for all City TPA sites. Conditional Closures stipulate further remedial activities are not required for soil. Figure 2-2 shows the locations of City TPA corrective action sites, and Table 2-2 provides a summary of PCS quantities removed from each site.

Thirty-nine monitoring wells are installed in the City area; NOAA uses these wells to investigate groundwater contamination and flow direction. NOAA conducted groundwater sampling during four consecutive quarters from 2003 to 2004, with analyte selection based on well and soil sampling history and location. Groundwater analytes included gasoline range organics (GRO); diesel range organics (DRO); benzene, toluene, ethylbenzene, and total xylenes (BTEX); select polynuclear aromatic hydrocarbons (PAH); metals; and total dissolved solids (TDS). For detailed analytical results, see Tetra Tech EM Inc.'s *Final Field Investigation Report, Pribilof Islands Restoration Project, St. Paul Island, Alaska* (TTEMI 2005a). Groundwater analyses indicated that areas within the City's harbor/industrial area are highly contaminated with DRO, GRO, benzene, toluene and ethylbenzene; while the City's residential areas are not contaminated with these constituents. For contaminated groundwater in City's harbor/industrial area, ADEC granted NOAA an increase in groundwater contaminant concentration cleanup levels to ten times (10X Rule) the levels listed in Table C of 18 Alaska Administrative Code 75



(18 AAC 75) contingent upon a determination by Alaska Department of Natural Resources (ADNR). A requirement for applying the 10X Rule is that institutional controls must be in place to prevent use of the groundwater for drinking or other purposes. NOAA has applied to ADNR, pursuant to Alaska Statute (AS) 46.15 and 11 AAC 93, for the establishment of a Critical Water Management Area (CWMA). The CWMA provides the institutional controls required for application of the 10X Rule by preventing the issuance of water use permits for groundwater withdrawal within the CWMA boundaries. The proposed 10X Rule and CWMA boundaries around the harbor/industrial area are shown on Figure 2-3. Figure 2-3 also shows estimated contaminant plume distribution and groundwater flow directions based on Mitretek Systems initial draft report *Tidal Corrections for Groundwater Flow in the Critical Water Management Area and the Diesel Seep Site, St. Paul Island, Alaska* (Mitretek 2005).

### **City of St. Paul Wells: Retention**

NOAA will retain the following ten wells as sentinel wells for long-term monitoring (Figure 2-3): MW46-23, MW46-9, MW46-14, MW46-15, MW46-31, MW46-24, MW46-12, MW46-4, MW46-3, and MWA-2. Four quarters of sample analyses have shown that groundwater in the vicinity of these wells is uncontaminated, and the locations of these wells between suspected plume areas and the CWMA boundary make them suitable for monitoring for potential contaminant migration. Sentinel wells will be sampled semiannually for five years; thereafter NOAA will evaluate the data and submit a recommendation to ADEC for further sampling or closure.

NOAA will retain the following nine wells for long-term monitoring of contaminant trends within known plumes (Figure 2-3): MW46-30, MW46-5, MW46-6, MW46-28, MW46-10, MW46-11, MW46-7, MWA-1, and MWA-3. Sample analyses have shown that groundwater is contaminated in the vicinity of these wells to levels above Table C cleanup criteria, and in the case of MW46-6 and MW46-28, above the 10X Rule cleanup criteria. Monitoring these wells will provide an indication of the effectiveness of remedial actions taken to-date (contaminated soil removal) in the harbor/industrial area, with the anticipated result of decreasing contaminant concentration trends. Contaminant trend wells will be sampled annually for five years; thereafter NOAA will evaluate the data and submit a recommendation to ADEC for further sampling or closure.

For all retained wells, groundwater sample analytes will be the previously identified contaminants of concern in Tract 46, namely DRO, GRO and BTEX. Sampling will be conducted in accordance with Section 3.0. Well monitoring will include inspection and photo documentation of well conditions, with

expedient repairs or other actions performed when required. NOAA will report analytical results to ADEC semiannually beginning in FY06 contingent on the availability of funds.

#### **City of St. Paul Wells: Decommission**

NOAA will decommission the following eleven wells (Figure 2-3): MW46-2, MWA-4, MWA-7, MWA-6, MWA-8, MW46-8, MWA-5, MW46-22, MW46-1, MW46-29, and MW46-21. Sample analyses have shown that groundwater is uncontaminated in the vicinity of these wells. NOAA has completed all soil remedial actions associated with these sites. Retention of these wells for possible future needs is less a consideration than the liability and cost associated with maintaining them. Well decommissioning will be in accordance with Section 4.0. Additionally, all retained wells will be decommissioned following completion of long-term monitoring requirements as approved by ADEC.

#### **City of St. Paul Wells: Transfer/Decommission**

NOAA will either transfer or decommission the following nine wells (Figure 2-3): MW46-20, MW46-13, MW46-17, MW46-18, MW46-19, MW46-26, MW46-25, MW46-27, and MW46-16. NOAA has been granted a Conditional Closure for TPA Site 9i (Figure 2-2), the only TPA site located within this area of the City (NOAA 2005a). In 2000, Public Law 104-91 was amended with Public Law 106-562 which introduced specific language prohibiting the use of NOAA's Pribilof Islands cleanup funds for remediation of contamination left at Formerly Used Defense Sites (FUDS) on the Pribilof Islands. Additionally, NOAA is not responsible for remediation of contamination caused or contributed to by local entities, officials, or landowners after March 15, 2000; or for releases at any time by third parties on private property following property transfer under the Alaska Native Claims Settlement Act of 1971 or the Transfer of Property Agreement of 1984. Soil and groundwater contamination contributable to historic FUDS activities or more contemporary third party spills is still present in areas monitored by these nine wells (NOAA 2005b). Figure 2-4 is a historic map of a naval radio station complex located in this area. NOAA will offer to transfer ownership and responsibility for these wells to DOD or to a third party. If other parties do not accept the transfer within 90 days following an official written offer, then NOAA will decommission these wells in accordance with Section 4.0.

## **2.2 SALT LAGOON DIESEL SEEP**

The Salt Lagoon Diesel Deep (Diesel Seep), TPA Site 13, is located approximately one-quarter mile north of City Tract 46. The site, situated between the Salt Lagoon Channel and the Polovina Turnpike (Figure 2-5), is the location of a former fur seal by-products plant. Site soil and groundwater contamination resulted from diesel fuel releases from storage tanks, transfer piping, and fueling operations at the plant.

Remediation of the Diesel Seep was first attempted in 1994 (OSC 1995), and then again during the 2004 field season. In 2004, remedial actions included excavation of approximately 10, 300 cubic yards of Petroleum Contaminated Soil (PCS); the installation of two trenches filled with sand bags containing granular activated carbon (GAC), with the trenches running parallel to the lagoon and perpendicular to groundwater flow; and the installation of barrier rock and erosion control fabric along the beach front (NOAA 2005c).

Three consulting firms have investigated groundwater at the Diesel Seep Site since the installation of five monitoring wells in 2000. The consultants were Columbia Environmental Services, Inc. (CESI) in 2000 (CESI 2001), IT Alaska, Inc. (IT) in 2001 (IT 2002), and Tetra Tech in 2004 (Tetra Tech 2005a). IT's and Tetra Tech's investigation reports conflict with the CESI report regarding well identifications. IT's analytical results also seemingly conflict with results from the CESI and Tetra Tech investigations for three wells. For clarity, the following table and discussion summarizes the history of groundwater monitoring at the Diesel Seep Site, and proposes explanations for noted report discrepancies.

Diesel Seep	Well 1	Well 2	Well 3	Well 4	Well 5
<b>CESI 2000</b>					
Report's Well ID	MWDS-1	MWDS-2	MWDS-3	MWDS-4	MWDS-5
GRO (µg/L)	190	ND	ND	ND	ND
DRO (µg/L)	<b>9000</b>	83	400	130	150
<b>IT 2001</b>					
Report's Well ID	MWDS-2	MWDS-1	MWDS-3	MWDS-4	MWDS-5
GRO (µg/L)	ND	ND	ND	ND	ND
DRO (µg/L)	320	ND	<b>2500</b>	130	ND
<b>Tetra Tech April 2004</b>					
Report's Well ID	MWDS-2	MWDS-1	MWDS-3	MWDS-4	MWDS-5
GRO (µg/L)	85	ND	ND	ND	ND
DRO (µg/L)	<b>2900</b>	ND	370	110	75
<b>Tetra Tech July 2004</b>					
Report's Well ID	MWDS-2	MWDS-1	MWDS-3	MWDS-4	MWDS-5
GRO (µg/L)	76	ND	ND	ND	ND
DRO (µg/L)	<b>2700</b>	ND	240	100	ND

**Bold Result**– Above ADEC Table C criteria.

ND – Not detected above Practical Quantitation Limit.

CESI installed five monitoring wells at the Diesel Seep Site in 2000. The CESI report identified the generic “Well 1” in the table above as “MWDS-1” and “Well 2” as “MWDS-2” (see Figure 5, CESI

2001). As indicated in the above table, the IT report (see Figure 3, IT 2002) reversed the identification of these wells. All reports generated subsequent to the IT report used IT's identification, *i.e.*, "Well 1" became "MWDS-2", and "Well 2" became "MWDS-1".

A possible discrepancy also exists with the assignment of IT's DRO analytical results between "Well 1" and "Well 3". The IT "Well 1" result of 320 µg/L differs significantly from the CESI and Tetra Tech DRO results that were above the ADEC cleanup criterion of 1,500 µg /L. Similarly, the IT "Well 3" DRO result of 2,500 µg/L differs significantly from CESI's and Tetra Tech's DRO results that were well below cleanup levels. As indicated by the table above, if IT's DRO "Well 1" and "Well 3" results were reversed, then they would closely match the corresponding levels found at those wells by CESI and Tetra Tech. IT's report does not provide clues that the wells were misidentified during sampling, or sample labels/results were inadvertently switched in the field or the lab. However, DRO results shown in the above table suggest that IT inadvertently misidentified the two wells.

In 2003 and 2004, prior to the 2004 PCS excavations, quarterly groundwater samples were drawn and analyzed for GRO, DRO, BTEX, and lead. Analytical results indicated that groundwater in the vicinity of monitoring well MWDS-2 (Figure 2-5) is contaminated with DRO in concentrations above the ADEC Table C cleanup level of 1500; no other analytes were found above Table C requirements at MWDS-2, and groundwater in the vicinity of the other Diesel Seep monitoring wells is below Table C cleanup levels for all analytes (Tetra Tech 2005a).

### **Diesel Seep Wells: Retention**

NOAA will retain MWDS-3 as a sentinel well (Figure 2-5). The location and analytical history (below ADEC cleanup standards) of this well are suitable for monitoring DRO migration at the edge of the 2004 PCS excavation. Additionally, visual inspections for petroleum sheen on the Salt Lagoon Channel will be conducted, coincident to well monitoring, to check the effectiveness of the GAC trenches in preventing residual petroleum from entering the lagoon. MWDS-3 will be sampled semiannually for three years; thereafter NOAA will evaluate the data and submit a recommendation to ADEC for further sampling or closure.

NOAA will retain MWDS-2 for long-term monitoring of contaminant trends (Figure 2-5). Groundwater in the vicinity of MWDS-2 is contaminated with DRO, however, due to the removal of PCS during the 2004 field season, the DRO concentration is expected to decrease over time. MWDS-2 will be sampled annually for three years; thereafter NOAA will evaluate the data and submit a recommendation to ADEC for further sampling or closure.

For retained wells, the groundwater sample analyte will be DRO. Sampling will be conducted in accordance with Section 3.0. Monitoring will include inspection and photo documentation of well conditions, with expedient repairs or other actions performed when required. Future sampling requirements will be determined based on initial three-year results. Reports of analytical results will be provided to ADEC semiannually beginning in FY06 contingent on the availability of funds.

### **Diesel Seep Wells: Decommission**

NOAA will decommission the following 3 wells (Figure 2-5): MWDS-1, MWDS-4, and MWDS-5. Sample analyses have shown that groundwater is uncontaminated in the vicinity of these wells. NOAA has completed all soil remedial actions associated with the Diesel Seep Site (NOAA 2005c). Retention of these wells for possible future needs is less a consideration than the liability and cost associated with maintaining them. Well decommissioning will be in accordance with Section 4.0. Additionally, all retained wells will be decommissioned following completion of long-term monitoring requirements as approved by ADEC.

## **2.3 ICEHOUSE LAKE**

The Icehouse Lake Site, TPA Site 14, is located approximately one mile north of the St. Paul Village, adjacent to Icehouse Lake and a prominent bend in Polovina Turnpike, the road that passes west of the site (Figure 2-6). The site, which consists of an open, graded, scoria pad adjacent to the eastern edge of the lake is identified as the Icehouse Lake Debris Site in the TPA. From the 1930s to the late 1950s, a diesel-powered pump was used to supply lake water to St. Paul Village for drinking water. The Icehouse Lake pumphouse and other structures were demolished in the early 1990s and a scoria pad was added for access to the lake. Fuel storage and disposal practices related to the former pumphouse introduced contamination to soil and groundwater at the site.

Soil remediation of this site was completed in 2004 with the excavation of 72 cubic yards of PCS (NOAA 2005d).

Six monitoring wells are installed at Icehouse Lake. In 2003 and 2004, quarterly groundwater samples were drawn and analyzed for GRO, DRO, BTEX, PAH, metals and TDS. Analytical results indicate that groundwater in the vicinity of monitoring well MWIHL-4 is consistently contaminated with GRO, DRO, and lead in concentrations above the ADEC Table C cleanup criteria; no other analytes were found above Table C levels at MWIHL-4, and groundwater in the vicinity of the other Icehouse Lake monitoring wells is below Table C cleanup levels for all analytes (Tetra Tech 2005a).

### **Icehouse Lake Wells: Retention**

NOAA will retain MWIHL-2 and MWIHL-6 as a sentinel wells (Figure 2-6). Groundwater flow in this area is directed away from the lake and toward MWIHL-2 and MWIHL-6 (IT 2001). These wells are suitable for monitoring contaminant migration due to their location down-gradient of MWIHL-4 and their analytical history below ADEC cleanup standards. MWIHL-2 and MWIHL-6 will be sampled semiannually for three years; thereafter, NOAA will evaluate the data and submit a recommendation to ADEC for further sampling or closure.

NOAA will retain MWIHL-4 for long-term monitoring of contaminant trends (Figure 2-6). Groundwater in the vicinity of MWIHL-4 is contaminated, however excavation of PCS during the 2004 field season should promote a decrease in contaminant concentrations over time. MWIHL-4 will be sampled annually for three years; thereafter, NOAA will evaluate the data and submit a recommendation to ADEC for further sampling or closure.

For retained wells, the groundwater sample analytes will be GRO, DRO, total and dissolved lead. Sampling will be conducted in accordance with Section 3.0. Monitoring will include inspection and photo documentation of well conditions, with expedient repairs or other actions performed when required. Reports of analytical results will be provided to ADEC semiannually beginning in FY06 contingent on the availability of funds.

### **Icehouse Lake Wells: Decommission**

NOAA will decommission the following 3 wells (Figure 2-6): MWIHL-1, MWIHL-3, and MWIHL-5. Sample analyses have shown that groundwater is uncontaminated in the vicinity of these wells. All soil remedial actions associated with the Icehouse Lake site have been completed (NOAA 2005d). Retention of these wells for possible future needs is less a consideration than the liability and cost associated with maintaining them. Well decommissioning will be in accordance with Section 4.0. Additionally, all retained wells will be decommissioned following completion of long-term monitoring requirements as approved by ADEC.

## **2.4 LUKANIN BAY DEBRIS SITE**

The Lukanin Bay Debris Site, TPA Site 12, is located about one mile northeast of the St. Paul Village, approximately 300 feet inland from Lukanin Bay (Figure 2-7). The site encompasses land on both sides of Diamond Hill Road, which transects the site. The site is characterized by vegetated, rolling sand dunes that slope generally eastward toward Lukanin Bay.

TPA Site 12 was previously used for the disposal of metal and wood debris, general household waste, metal drums, government vehicles and steel storage tanks. Corrective actions were completed at the site in 2004 that included excavation of 1,778 cubic yards of PCS and removal of approximately 395 cubic yards of debris such as drum remains, scrap wood and metal (Tetra Tech 2005b).

Three monitoring wells are installed at Lukanin Bay. In 2003 and 2004, quarterly groundwater samples were drawn and analyzed for GRO, DRO, BTEX, PAH, metals and TDS. Analytical results indicate that groundwater is not contaminated at the Lukanin Bay Debris Site (Tetra Tech 2005a).

#### **Lukanin Bay Wells: Retention**

NOAA will not retain any wells at the Lukanin Bay Debris Site.

#### **Lukanin Bay Wells: Decommission**

NOAA will decommission the following 3 wells (Figure 2-7): MWLB-1, MWLB-2, and MWLB-3. Sample analyses have shown that groundwater is uncontaminated in the vicinity of these wells. NOAA has completed all remedial actions associated with the Lukanin Bay Debris Site and has been granted a Conditional Closure by ADEC (NOAA 2005e). Retention of these wells for possible future needs is less a consideration than the liability and cost associated with maintaining them. Well decommissioning will be in accordance with Section 4.0.

### **2.5 FORMER ST. PAUL LANDFILL**

The former St. Paul Municipal Landfill, TPA Site 5, is located about 3 miles north of St. Paul Village. This site was an active landfill that accepted the island community's municipal waste, demolition and construction debris, and served as a disposal area for used oil. NOAA conducted several remedial actions at the landfill from 2000 to 2004 to address municipal solid waste issues and petroleum contamination at sub-TPA Sites 5b, 5c, and 5d, which are owned by the City (Tetra Tech 2004). Conditional Closures have been approved by ADEC for Site 5b (approved November 15, 2004), Site 5c (approved April 11, 2005) and Site 5d (approved February 11, 2005). NOAA retains ownership of a portion of the landfill designated TPA Site 5a (Cell C) within property Tract 42. Cell C was capped with PCS in 2004 (NOAA 2005f).

Cell C contains 25,267 cubic yards of PCS from various TPA sites on St. Paul Island. As required by applicable Corrective Action Plans (CAP), the PCS was sampled prior to being placed on Cell C. Sample analytical results indicated the contaminants of concern for PCS at Tract 42 are GRO, DRO, and BTEX.

Eight monitoring wells are currently installed at St. Paul Landfill. In 2003 and 2004, quarterly groundwater samples were drawn from 5 wells at the site (one of which was subsequently decommissioned to allow for completion of installation of Cell C) and analyzed for GRO, DRO, BTEX, PAH, metals and TDS. Analytical results indicated that groundwater is uncontaminated in the vicinity of St. Paul Landfill, with the exception that in October 2003 monitoring well MWSNPLF-1 (Figure 2-8) had one lead analysis at 16.4 µg/L, which is slightly above the ADEC cleanup criterion of 15 µg/L (Tetra Tech 2005a). This result may be an anomaly because all other lead results have been well below cleanup levels, and PCS within Cell C has been sampled and found not contaminated with lead concentrations above the ADEC Table B “Migration to Groundwater” cleanup criterion.

#### **St. Paul Landfill Wells: Retention**

ADEC Solid Waste regulations require long-term groundwater monitoring of closed landfill sites. NOAA will retain all eight remaining wells at the St. Paul Landfill site to monitor for contaminant migration associated with former disposal activities in and around Tract 42 (Figure 2-8). The monitoring wells include MWSNPLF-1, MWSNPLF-10, HC-4, MWSNPLF-9, HC-5, MWSNPLF-11, MWSNPLF-12 and MWSNPLF-13. Note that although MWSNPLF-9 and HC-5 are located close together, these wells are both needed to monitor the entire aquifer due to differing screen depths. The St. Paul landfill monitoring wells will be sampled annually for five years; thereafter, NOAA will evaluate the data and submit a recommendation to ADEC for further sampling or closure. Post-closure monitoring of the Cell C cover is specified in NOAA’s Cell C (Tract 42) closure report (NOAA 2005f).

For retained wells, the groundwater sample analytes will be GRO, DRO, BTEX, total and dissolved lead. Sampling will be conducted in accordance with Section 3.0. Monitoring will include inspection and photo documentation of well conditions, with expedient repairs or other actions performed when required. Future sampling requirements will be determined based on initial five-year results. Reports of analytical results will be provided to ADEC annually beginning in FY06 contingent on the availability of funds.

#### **St. Paul Landfill Wells: Decommission**

Retained wells will be decommissioned following completion of long-term monitoring requirements as approved by ADEC.

## **2.6 NATIONAL WEATHER SERVICE LANDSPREADING AREA/OIL DRUM DUMP**

The NWS Landspreading Area/Oil Drum Dump Site is located about 3.5 miles northeast of the City of St. Paul, about 1.5 miles east of the St. Paul airport, and is separated from the Bering Sea by several dune



ridges. The landspreading area is accessed by the main road running from the airport, while the Oil Drum Dump (TPA Site 1) is served by an unimproved, unmarked road running north-south, terminating at TPA Site 1 (Figure 2-9).

NOAA's Pribilof Project Office chose landspreading as a practicable means of achieving remediation of PCS excavated from various locations on St. Paul Island. Approximately 2,600 cubic yards of PCS was spread in an 18-inch deep layer across National Weather Service (NWS) property in 2004 (NOAA 2005f). The PCS layer was periodically tilled during 2004 to allow organics to volatilize. In 2005, the landspreading area will be seeded with local varieties of grass to help prevent wind and water erosion during natural biodegradation of petroleum contaminants in the soil. In 2004, NOAA installed wells MWLS-1, MWLS-2, and MWLS-3 (Figure 2-9) to monitor for contaminants migrating from the PCS layer to groundwater.

Northeast of the landspreading area is the location of the Oil Drum Dump Site, which was used as a disposal area for drums and debris during the 1940s and later decades. Department of Defense identifies the Oil Drum Dump Site as Formerly Used Defense Site B-1 (FUDS B-1). In 1986, a DOD contractor (Chase Construction, Inc.) removed approximately 4,000 waste drums and metal debris from this area (NOAA 2004a). At this time, DOD constructed a centrally located gravel pad for drum staging. At the end of the 1986 action, over 300 waste drums, determined to be "non DOD related", were left on the central pad. In 1992 a DOD environmental consultant (Ecology & Environment Inc.) investigated FUDS B-1 and observed approximately 350 rusting drums on the central pad, petroleum odors, petroleum saturated soils, partially buried drums in the surrounding FUDS B-1 area, and various debris still remaining at the site. In 1992 a DOD contractor (Harding and Lawson Associates) consolidated drum contents and removed approximately 200 drums, leaving over 100 waste drums on the central pad. In 1994, another DOD consultant (Woodward-Clyde) performed a site inspection and observed approximately 100 drums, some leaking, on the central pad. In 1994, DOD contractor Oil Spill Consultants found 174 drums and heavy soil contamination due to drum punctures. Oil Spill Consultants consolidated drum contents and removed the remaining drums from the central pad. After the 1994 DOD action, known soil contamination and miscellaneous debris still remained at FUDS B-1.

In 1996, the TPA was signed and the central pad within FUDS B-1 was designated TPA Site 1 (Oil Drum Dump). In 1996, NOAA collected surface soil samples from the central pad area (NOAA 2004a). Analytical results of these samples confirmed the earlier observations of petroleum contamination of TPA Site 1 resulting from DOD drum handling and storage activities between 1986 and 1994. In 1997, as part of a cooperative agreement with NOAA, Bering Sea Eccotech, Inc. removed the majority of the surface

debris remaining in the area. In 1999, NOAA consultants installed the five Oil Drum Dump Site monitoring wells (Figure 2-9); and collected soil and groundwater samples from FUDS B-1, including TPA Site 1. Analytical results of the soil and groundwater samples confirmed earlier observations of contamination remaining at FUDS B-1 (NOAA 2004a).

#### **NWS Landspreading Area/Oil Drum Dump Site Wells: Retention**

ADEC does not require NOAA to monitor groundwater at the NWS landspreading area. However, NOAA will retain the following four wells for long-term monitoring of contaminant trends (Figure 2-9): MWLS-1, MWLS-2, MWLS-3, and MWODDS-4 to address concerns posed by NOAA's Weather Service which manages the property. The locations of these wells near the area where PCS was placed on NWS property make them suitable for monitoring contaminant migration from the PCS to groundwater in the area. MWLS-1, MWLS-2, and MWLS-3 have not been sampled previously. Analyses of samples drawn from MWODDS-4 in 1999 indicate all contaminants below ADEC cleanup criteria (NOAA 2004a). Wells will be sampled annually under this long-term monitoring plan for three years beginning in FY06 contingent on the availability of funds; thereafter NOAA will evaluate the data and determine whether further sampling or closure is appropriate.

For all retained wells, groundwater sample analytes will be the contaminants of concern for PCS excavated from TPA Sites on St. Paul Island, *i.e.*, DRO, GRO and BTEX. Sampling will be conducted in accordance with Section 3.0. Well monitoring will include inspection and photo documentation of well conditions, with expedient repairs or other actions performed when required. Although not required, reports of analytical results will be provided to ADEC annually.

#### **NWS Landspreading Area/Oil Drum Dump Site Wells: Transfer/Decommission**

NOAA will either transfer to DOD or decommission the following four wells (Figure 2-9): MWODDS-1, MWODDS-2, MWODDS-3, and MWODDS-5. Documented Department of Defense drum handling practices at TPA Site 1 (central gravel pad for FUDS B-1) resulted in soil and groundwater contamination at this site. Any future cleanup of FUDS B-1/TPA Site 1 cannot, by public law, be funded by NOAA. NOAA cannot expend Pribilof cleanup funds to inspect and maintain these wells. NOAA will offer to transfer ownership and responsibility for these wells to DOD. If the transfer is not completed within 90 days following an official written offer, NOAA will decommission these wells in accordance with Section 4.0.

## **2.7 VEHICLE BONEYARD**

The Vehicle Boneyard (TPA Site 2) is located on the eastern portion of St. Paul Island north of Polovina Hill and south of Big Lake. The major portion of the site, the Vehicle Boneyard proper, was used for disposal of old vehicles, drums, and debris. The northwestern portion of the site was reportedly used for disposal of emptied drums and debris originating from FUDS B-1 and FUDS C during DOD remediation of those sites in 1986. The TPA Site 2 and the reported FUDS disposal area border (to the south and east) the proposed location for a new landfill for Saint Paul Island. The site is served by an unmarked access road running east/west and connecting with the Polovina Turnpike to the east and Little Polovina Road to the west. Access control is by a locked gate from the east and a warning sign from the west.

NOAA contractor Harding Lawson Associates drained fluid from 240 vehicles in 1992. In 1994, Oil Spill Consultants identified and removed 213 drums from the site. In 1997, Bering Sea Eccotech, Inc. (BSE) removed approximately 2,460 tons of bulk surface debris (metal, tires, and batteries) from the Vehicle Boneyard and other smaller sites. No stained soils were observed at the Vehicle Boneyard during debris removal. In 2003, NOAA consolidated remaining surface debris in a single location and placed a two-foot thick clean material cover over it. The cover material was graded and contoured to ensure proper surface runoff. In 2004, NOAA completed erosion control measures that included fertilizing and seeding the cover with native grass varieties, and installing erosion control matting (Tetra Tech 2005c).

In 1999, Tetra Tech EM, Inc. removed 18.5 tons of debris from the site, and performed subsurface soil sampling at ten locations. Only one location had analytical results for DRO and RRO above ADEC cleanup criteria. In 2000, 13 monitoring wells were installed; in 2000 and 2001, five rounds of groundwater samples were taken and analyzed for GRO, DRO, RRO, VOCs, PAHs, and metals. No contaminant analyte concentrations exceeded ADEC cleanup levels (Tetra Tech 2005c).

### **Vehicle Boneyard Wells: Retention**

NOAA will not retain any wells at Vehicle Boneyard. Inspection and maintenance of the TPA Site 2 cover material are specified in NOAA's Vehicle Boneyard Corrective Action Report (Tetra Tech 2005c).

### **Vehicle Boneyard Wells: Transfer/Decommission**

NOAA will either transfer to DOD or the City of St. Paul (for possible use with the new municipal landfill site) the following 13 wells: MWVB-1 through MWVB-13 (Figure 2-10), or NOAA will decommission any wells not transferred to the aforementioned entities. Wells will be decommissioned in accordance with Section 4.0.

## 2.8 TELEGRAPH HILL SCORIA PIT

The Telegraph Hill scoria pit site is designated TPA Site 15-1 by NOAA, and as FUDS C by DOD. The site is located along the northwest side of Telegraph Hill, about two miles north of the City of St. Paul. Telegraph Hill reportedly received its name from the establishment of a military telegraph station atop its summit. In the past, the site was used as an oil drum and debris disposal area. Currently, as well as historically, the site is quarried for volcanic scoria. The following is a summary of remedial activities and investigations conducted at the Telegraph Hill Scoria Pit, more detailed information can be found in NOAA's *Final Site Characterization Report, Telegraph Hill Scoria Pit Site, Two-Party Agreement Site No. 15-1, Pribilof Islands Environmental Restoration Project, St. Paul Island, Alaska* (NOAA 2004b).

In 1986, DOD contractor Chase Construction, Inc. removed an estimated 4,000 drums and various debris from FUDS C.

In 1992, an assessment by Ecology and Environment, Inc. observed two power shovels and approximately 175 rusted drums in the area, but no soil staining.

In 1997, Aleutian Enterprises removed the power shovels and drum debris.

In 1999, Tetra Tech performed a debris survey and observed crushed drums that had been excavated during scoria mining. These drums purportedly had been buried at the site in the 1940's and 1950's and were relics of the World War II era. Tetra Tech also observed approximately 100 newer intact drums stockpiled near the southern boundary of the active quarry pit, but could not determine when the drums had been placed there. Tetra Tech could not confirm that any of the observed debris and drums originated from NOAA activities. Tetra Tech observed only one small area of surface soil staining; analyses of a sample taken from this spot indicated only DRO slightly above ADEC cleanup standards (GRO, RRO, VOCs and BTEX were not detected).

In 2000, BSE and Nortech removed drums and other debris from the site. Metallic debris was barged to Seattle, Washington for recycling. No soil staining, stressed vegetation, hydrocarbon odors, or other indication of contamination was observed during removal actions.

In 2000, CESI installed monitoring wells MWTH-1 through MWTH-5 (Figure 2-11), and conducted soil and groundwater sampling. The petroleum-stained soil area sampled in 1999 by Tetra Tech was included in CESI's sampling. In 2001 IT conducted groundwater sampling. Analytical results from the CESI and

IT sampling events were all below applicable ADEC cleanup criteria, or below background concentration levels in the case of metals.

A review of the analytical results from all sampling conducted at TPA Site 15-1 leads to the conclusion that this site is not contaminated (NOAA 2004b). Additionally, historic records indicate that past use of this site as an oil drum and debris disposal area was likely tied to DOD activities, therefore under PL-106-562 NOAA cannot expend funds to maintain monitoring wells at this site.

On August 24, 2004, ADEC determined that no further action was required at TPA 15-1 Telegraph Hill (ADEC 2004).

#### **Telegraph Hill Scoria Pit Wells: Retention**

NOAA will not retain any wells at Telegraph Hill Scoria Pit.

#### **Telegraph Hill Scoria Pit Wells: Transfer/Decommission**

NOAA will either transfer to DOD or decommission the following five wells (Figure 2-11): MWTH-1, MWTH--2, MWTH--3, MWTH-4, and MWTH--5. However, with site investigation sampling results indicating that soil and groundwater contamination is below ADEC cleanup criteria, it is likely DOD will decline receiving these wells and they will be decommissioned by NOAA in accordance with Section 4.0.

### **3.0 GROUNDWATER SAMPLING AND ANALYSIS**

Groundwater sampling methodology, laboratory analyses, equipment decontamination procedures, and analytical data quality are described in the following sections.

#### **3.1 GROUNDWATER SAMPLING METHODOLOGY**

The retained monitoring wells will be sampled using a low-flow groundwater sampling technique in accordance with an approved standard operating procedure (SOP) for micropurging and sampling of groundwater.

Prior to sampling, the static water level in the well will be measured using an electronic water level indicator. The wells will then be purged using a GEOPUMP peristaltic pump (wells where water table is less than 30 feet deep below the ground surface) or a Grundfos Rediflo2™ submersible pump (wells where the water table is deeper than 30 feet below the ground surface) with dedicated low-density polyethylene tubing. In general, the wells will be purged at a low-flow rate (less than 500 milliliters per minute) while pH, temperature, conductivity, turbidity, dissolved oxygen, and oxidation-reduction potential will be monitored. After water quality parameters have stabilized in the well according to readings on a water quality meter, groundwater samples will be collected. During collection of groundwater samples for volatile organic compound (VOC) and gasoline range organics (GRO) analyses, the pumping rate will be reduced to less than 200 milliliters per minute to minimize the loss of VOCs. Samples to be evaluated for dissolved lead will filter in the field using a 0.45-micron filter, then preserved to <2 pH units with reagent-grade nitric acid. After samples have been collected, each sample container will be placed in a cooler with frozen gel packs to maintain the temperature at 4 °C +/- 2 °C.

#### **3.2 LABORATORY ANALYSIS OF GROUNDWATER SAMPLES**

Groundwater samples will be shipped overnight to an ADEC approved fix lab for analysis. Groundwater samples will be analyzed using the following analytical methods:

- GRO by ADEC Method AK101
- DRO by ADEC Method AK102
- BTEX by U.S. Environmental Protection Agency (EPA) Method 8260B
- Lead by EPA Method 6020

### **3.3 EQUIPMENT DECONTAMINATION**

Before and after each deep monitoring well is sampled, the submersible pump will be decontaminated. The pump will be placed in a clean bucket that contains a solution of hot tap water and Alconox soap, and a piece of new, dedicated tubing of sufficient length to redirect the flow from the pump back into the bucket will be attached to the pump. The pump will be turned on and allowed to recirculate in the bucket for a minimum of five minutes. The inside of the pump will then be rinsed using clean tap water in a bucket, allowing the pump to run for a minimum of three minutes.

### **3.4 ANALYTICAL DATA QUALITY**

Analytical data quality will be evaluated per the procedures of NOAA's Master Quality Assurance Plan (NOAA 2003a).

### **3.5 WASTE MANAGEMENT**

Waste generated as a result of monitoring well sampling will be managed in accordance with NOAA's Master Investigation-Derived Waste Plan (NOAA 2003b).

#### **4.0 WELL DECOMMISSIONING**

Well decommissioning shall be conducted in accordance with requirements specified in 18 AAC 75.345(j).

Well decommissioning activities will be documented on completed Well Abandonment Forms that will be forwarded to the ADEC, Division of Environmental Health, Drinking Water Program.



## 5.0 REFERENCES

- ADEC 2003. Title 18 of the Alaska Administrative Code 75, Articles 3 and 9. Oil and Hazardous Substances Pollution Control Regulations. State of Alaska. Effective date January 30, 2003.
- ADEC 2004. Letter (File No. 2644.38.030) From Mr. Louis Howard (ADEC) to Mr. John Lindsay (NOAA) Re: Telegraph Hill Two-Party Agreement (TPA) Site 15, St. Paul Island Alaska. Dated August 24, 2004.
- CESI 2001. Draft Site Characterization Report, Salt Lagoon Diesel Seep (TPA Site 13), St. Paul Island, AK. Columbia Environmental Sciences, Inc. April 26.
- IT 2001. Draft Site Characterization Report for Icehouse Lake (TPA Site 14), St. Paul Island, Alaska. IT Alaska, Inc. December.
- IT 2002. Draft Site Characterization Report for Salt Lagoon Diesel Seep (TPA Site 13), St. Paul Island, Alaska. IT Alaska, Inc. February.
- Mitretek 2005. Initial Draft Tidal Corrections for Groundwater Flow in the Critical Water Management Area and the Diesel Seep Site, St. Paul Island, Alaska. Mitretek Systems. May 5.
- NOAA 1996. Pribilof Islands Environmental Restoration Two-Party Agreement, Attorney General's Office File No. 661-95-0126. National Oceanic and Atmospheric Administration. January 26.
- NOAA 2003a. Master Quality Assurance Plan. Prepared for Work on Pribilof Islands, Alaska. National Oceanic and Atmospheric Administration's Pribilof Project Office. August.
- NOAA 2003b. Master Investigation-Derived Waste Plan. Prepared for Work on Pribilof Islands, Alaska. National Oceanic and Atmospheric Administration's Pribilof Project Office. May.
- NOAA 2004a. Final Site Characterization Report, Oil Drum Dump Site (Two-Party Agreement Site No. 1 and Formerly Used Defense Site B-1), Pribilof Islands Environmental Restoration Project, St. Paul Island, Alaska. November.
- NOAA 2004b. Final Site Characterization Report, Telegraph Hill Scoria Pit Site, Two-Party Agreement Site No. 15-1, Pribilof Islands Environmental Restoration Project, St. Paul Island, Alaska. December.
- NOAA 2005a. Request for Conditional Closure, TPA Site 9i, NOAA Site 24, Duplex Building and E-Shop, St. Paul Island, Alaska. Approved by ADEC February 11, 2005.
- NOAA 2005b. The History of Parcel 6f, the ATCO Building, and the Windmill Wells on ST. Paul Island, Alaska as it Relates to Soil and Groundwater Cleanup Needs and Responsibilities. June 2005.
- NOAA 2005c. Corrective Action Report, Sites 34 and 35/TPA Sites 13a and 13b –Salt Lagoon Diesel Seep, St. Paul Island, Alaska. Draft report pending.
- NOAA 2005d. Final Corrective Action Report, Icehouse Lake (Site 36/TPA Sites 14), St. Paul Island, Alaska. May 24.
- NOAA 2005e. Request for Conditional Closure, Lukanin Bay Site, TPA Sites 12a, 12b, 12c/NOAA Sites 31, 32, 33, St. Paul Island, Alaska. Approved by ADEC May 5, 2005.

NOAA 2005f. Closure Report, Site 5 /TPA Site 5a – St.. Paul Landfill Cell C (Tract 42), St. Paul Island, Alaska. Draft report pending.

OSC 1995. Final Report, Contaminated Soil Excavation and Stockpile on St. Paul Island, Alaska. Oil Spill Consultants. April.

Tetra Tech 2004. Final Closure Report Site 6/TPA Site 5b – St. Paul Landfill Cell A Site 7/TPA Site 5c – St. Paul Landfill Cell B (Drum Dump) Site 8/TPA Site 5d – St. Paul Island Landfill Cell B (Solid Waste) St. Paul Island, Alaska. Tetra Tech EM Inc. November 30.

Tetra Tech 2005a. Final Field Investigation Report, Pribilof Islands Environmental Restoration Project, St. Paul Island, Alaska. Tetra Tech EM Inc. June 23.

Tetra Tech 2005b. Final Corrective Action Report, Site 33/TPA Site 12c– Lukanin Bay PCS Site, St. Paul Island, Alaska. Tetra Tech EM Inc. March 16.

Tetra Tech 2005c. Final Corrective Action Report, Site 2/TPA Site 2 – Vehicle Boneyard, St. Paul Island, Alaska. Tetra Tech EM Inc. February 24.

## FIGURES

## **TABLES**

**TABLE 2-1**  
**LONG-TERM PLANS FOR ST. PAUL MONITORING WELLS**

St. Paul Island Monitoring Wells	Retain As Sentinel	Retain For Contaminant Trends	Decommission	Decom. or Transfer	Analytes	Monitoring Years/Freq.
<b>City of St. Paul</b>						
MW46-1			X		NA	
MW46-2			X		NA	
MW46-3	X				GRO, DRO, BTEX	5/Semi-Ann
MW46-4	X				GRO, DRO, BTEX	5/Semi-Ann
MW46-5		X			GRO, DRO, BTEX	5/Annual
MW46-6		X			GRO, DRO, BTEX	5/Annual
MW46-7		X			GRO, DRO, BTEX	5/Annual
MW46-8			X		NA	
MW46-9	X				GRO, DRO, BTEX	5/Semi-Ann
MW46-10		X			GRO, DRO, BTEX	5/Annual
MW46-11		X			GRO, DRO, BTEX	5/Annual
MW46-12	X				GRO, DRO, BTEX	5/Semi-Ann
MW46-13				X	NA	
MW46-14	X				GRO, DRO, BTEX	5/Semi-Ann
MW46-15	X				GRO, DRO, BTEX	5/Semi-Ann
MW46-16				X	NA	
MW46-17				X	NA	
MW46-18				X	NA	
MW46-19				X	NA	
MW46-20				X	NA	
MW46-21			X		NA	
MW46-22			X		NA	
MW46-23	X				GRO, DRO, BTEX	5/Semi-Ann
MW46-24	X				GRO, DRO, BTEX	5/Semi-Ann
MW46-25				X	NA	
MW46-26				X	NA	
MW46-27				X	NA	
MW46-28		X			GRO, DRO, BTEX	5/Annual
MW46-29			X		NA	
MW46-30		X			GRO, DRO, BTEX	5/Annual
MW46-31	X				GRO, DRO, BTEX	5/Semi-Ann
MWA-1		X			GRO, DRO, BTEX	5/Annual
MWA-2	X				GRO, DRO, BTEX	5/Semi-Ann
MWA-3		X			GRO, DRO, BTEX	5/Annual
MWA-4			X		NA	
MWA-5			X		NA	
MWA-6			X		NA	
MWA-7			X		NA	
MWA-8			X		NA	
<b>Diesel Seep Site</b>						
MWDS-1			X		NA	
MWDS-2		X			DRO	3/Annual
MWDS-3	X				DRO	3/Semi-Ann
MWDS-4			X		NA	
MWDS-5			X		NA	
<b>Icehouse Lake</b>						
MWIHL-1			X		NA	
MWIHL-2	X				GRO, DRO, Lead <sup>1</sup>	3/Semi-Ann
MWIHL-3			X		NA	
MWIHL-4		X			GRO, DRO, Lead <sup>1</sup>	3/Annual
MWIHL-5			X		NA	

<b>TABLE 2-1 Continued</b>						
St. Paul Island Monitoring Wells	Retain As Sentinel	Retain For Contaminant Trends	Decommission	Decom. or Transfer	Analytes	Monitoring Years/Freq.
MWIHL-6	X				GRO, DRO, Lead <sup>1</sup>	3/Semi-Ann
<b>Lukanin Bay</b>						
MWLB-1			X		NA	
MWLB-2			X		NA	
MWLB-3			X		NA	
<b>St. Paul Landfill</b>						
MWSNPLF-1		X			GRO, DRO, BTEX, Lead <sup>1</sup>	5/Annual
MWSNPLF-9		X			GRO, DRO, BTEX, Lead <sup>1</sup>	5/Annual
MWSNPLF-10		X			GRO, DRO, BTEX, Lead <sup>1</sup>	5/Annual
MWSNPLF-11		X			GRO, DRO, BTEX, Lead <sup>1</sup>	5/Annual
MWSNPLF-12		X			GRO, DRO, BTEX, Lead <sup>1</sup>	5/Annual
MWSNPLF-13		X			GRO, DRO, BTEX, Lead <sup>1</sup>	5/Annual
HC-4		X			GRO, DRO, BTEX, Lead <sup>1</sup>	5/Annual
HC-5		X			GRO, DRO, BTEX, Lead <sup>1</sup>	5/Annual
<b>NWS LS/ODDS</b>						
MWLS-1		X			GRO, DRO, BTEX	3/Annual
MWLS-2		X			GRO, DRO, BTEX	3/Annual
MWLS-3		X			GRO, DRO, BTEX	3/Annual
MWODDS-1				X	NA	
MWODDS-2				X	NA	
MWODDS-3				X	NA	
MWODDS-4		X			GRO, DRO, BTEX	3/Annual
MWODDS-5				X	NA	
<b>Vehicle Boneyard</b>						
MWVB-1				X	NA	
MWVB-2				X	NA	
MWVB-3				X	NA	
MWVB-4				X	NA	
MWVB-5				X	NA	
MWVB-6				X	NA	
MWVB-7				X	NA	
MWVB-8				X	NA	
MWVB-9				X	NA	
MWVB-10				X	NA	
MWVB-11				X	NA	
MWVB-12				X	NA	
MWVB-13				X	NA	
<b>Telegraph Hill Scoria Pit</b>						
MWTH-1				X	NA	
MWTH-2				X	NA	
MWTH-3				X	NA	
MWTH-4				X	NA	
MWTH-5				X	NA	

Note 1 – Lead samples to be analyzed/field filtered for total/dissolved lead

GRO - Gasoline Range Organics

DRO – Diesel Range Organics

BTEX – Benzene, Toluene, Ethylbenzene, Total Xylenes

NWS LS/ODDS – National Weather Service Landspread/Oil Drum Dump Site

**TABLE 2-2**  
**CITY OF ST. PAUL TPA SITE EXCAVATION QUANTITIES**

<b>TPA Site Number</b>	<b>Site Name</b>	<b>Total PCS Removal (cubic yards)</b>
9a	Old Movie Theater	25
9b	Former Power Plant	420
9c	Decommissioned Power Plant	428
9d	Decommissioned Power Plant Annex	300
9e	Municipal Garage/Machine Shop	2,805
9f	Old Coal Shed (Cascade Building)	3,655
9g	Former Fouke Bunkhouse	155
9h	Former Alaska Dormitory	160
9i	Duplex Builing and Former Electrical Shop	170
9j	Five Car Garage and Anderson Building	80
9k	AST Saddle Complex	1,370
9l	Old Sealing Plant/Barreling Shed	10
9m	Saltwater Wells	not excavated
9n	Gas Station and Garage	0
9o	Former Gasoline/Diesel Fuel Drum Storage	1,160
9p	West Dock Fuel Transfer Facility	250
9q	House 101	65
9r	House 102	50
9s	House 103	80
11	Former Diesel Tank Farm	6,550
<b>Total</b>		<b>17,733</b>